

Cibola Fire Burned Area Rehabilitation Plan

**U.S. Fish and Wildlife Service
Southwest Region 2**

September 2006

Parametrix

Cibola Fire: Burned Area Rehabilitation Plan Review and Approval

Prepared for

U.S. Fish and Wildlife Service
Southwest Region 2
500 Gold Avenue S.W.
Albuquerque, NM 87103

Prepared by

Parametrix
6739 Academy Rd. NE, Suite 350
Albuquerque, NM 87109
505-323-0050
www.parametrix.com

BURNED AREA REHABILITATION PLAN REVIEW AND APPROVAL

I. Project Leader approval that the Burned Area Rehabilitation Plan meets approved land management plan management objectives.

Bill Seese, Refuge Manager, Cibola NWR, USFWS

Date

II. Regional Fire Management Coordinator concurs that plan fits the technical definition for use of Burned Area Rehabilitation funding.

Dave Lentz, Regional Fire Management Coordinator, Region 2, USFWS

Date

III. Burned Area Rehabilitation Approval (check one box below):

- ☐ Approved
- ☐ Approved with Revision (see attached)
- ☐ Disapproved

Dr. Benjamin N. Tuggle, Regional Director, Region 2, U.S. Fish and Wildlife Service

Date

IV. Burned Area Rehabilitation Approval (check one box below):

- ☐ Approved
- ☐ Approved with Revision (see attached)
- ☐ Disapproved

Brian McManus, Chief, Branch of Fire Management

Date

Cibola Fire

BURNED AREA REHABILITATION PLAN

UNIT: Cibola National Wildlife Refuge

LOCATION: La Paz County, Arizona

DATE: September 21, 2006

PREPARED BY: Parametrix, Inc.

Submitted By: _____
Bill Seese, Refuge Manager
Cibola NWR

Date: _____

EXECUTIVE SUMMARY

Introduction

This Burned Area Rehabilitation (BAR) Plan, which provides rehabilitation recommendations for the Cibola Fire, has been prepared in accordance with Department of the Interior and U.S. Fish and Wildlife Service (FWS) policy, the Cibola National Wildlife Refuge (Refuge) Habitat Management Plan, and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan. The primary objectives are to:

- Control spread of invasive, noxious, and exotic species, particularly saltcedar, in order to mitigate future threats to important watershed and wildlife resources, Threatened, Endangered, and Candidate species, and valuable wildlife habitat.
- Assess current site conditions for rehabilitation alternatives to inform future rehabilitation planning and to enhance cost efficient and successful rehabilitation treatments.
- Rehabilitate native vegetation that is more suitable for Threatened and Endangered species, wildlife, watershed and ecosystem function, and less prone to wildfire impacts.

Fire Background

The Cibola Fire was a lightning-strike fire that ignited on July 17, 2006 on the Cibola National Wildlife Refuge, Yuma County, Arizona. Values immediately in danger included important fish and wildlife habitat, including habitat for the Endangered Southwestern willow flycatcher (*Empidonax trailii eximus*) and Yuma Clapper Rail (*Rallus longirostris yumanensis*), one Candidate Species, the yellow-billed cuckoo (*Coccyzus americanus*), and two captive reared Endangered fish - the bonytail chub (*Gila elegans*) and razorback sucker (*Xyrauchen texanus*). The razorback sucker may also be present in the river-connected part of the historic river channel since it is being actively reintroduced into the Colorado in this area. Both species were present in High Levee Pond prior to the burn. The river and adjacent floodplain have been designated as Critical Habitat for the razorback sucker.

The fire was controlled on July 22 after burning a total of 4,662 acres. There were approximately 100 firefighting resources that responded to the fire during the operational period from July 17-22, 2006. These interagency resources came from the USFWS, BLM, USFS, NPS, and the states of AZ and CA. The fire severity class was estimated at 85% high severity with 15% moderate severity.

Fire Damages and Threats to Human Safety and Natural and Cultural Resources

The fire burned a mix of saltcedar and native vegetation (Table 2).

The greatest post-fire threats to resources are:

- Increased cover and density of invasive, exotic, and noxious species within the burned area and affects to adjacent habitat of Threatened, Endangered, and Candidate species, and especially the Endangered southwestern willow flycatcher.
- Continued extreme fire hazard within burned area and to adjacent wildlife habitat resulting from rapid regeneration of fire-prone exotic saltcedar (a Class C noxious weed).

TABLE OF CONTENTS

PART A - FIRE LOCATION AND BACKGROUND INFORMATION	1
PART B - NATURE OF PLAN	1
PART C – REHABILITATION ASSESSMENT	1
Rehabilitation Objectives	1
PART D – BAR TEAM RESOURCE ADVISORS	5
PART E - SUMMARY OF tREATMENTS, ACTIVITIES AND COSTS	6
PART F - INDIVIDUAL SPECIFICATION - MECHANICAL Treatments (1)	7
PART F - INDIVIDUAL SPECIFICATION - Herbicide Treatments (2)	9
PART F - INDIVIDUAL SPECIFICATION - Rehabilitation Planning (3)	11
PART F - INDIVIDUAL SPECIFICATION - Topographic Survey (LIDAR) (4)	13
PART F - INDIVIDUAL SPECIFICATION - Groundwater Assessment (5)	15
PART F - INDIVIDUAL SPECIFICATION - Rehabilitation Planning Technical Support (6)	17
PART F - INDIVIDUAL SPECIFICATION - BAER Implementation Leader (7)	19
PART F - INDIVIDUAL SPECIFICATION - Revegetation (8)	21
PART F - INDIVIDUAL SPECIFICATION - Treatment Effectiveness Monitoring (9)	23
PART G - POST- Burned Area rehabilitation REQUIREMENT	25
PART H – CONSULTATIONS/Contact Information	26

APPENDICES

- I Burned Area Assessment Report
- II Environmental Compliance
- III Soils Investigations for the Rehabilitation of Burned Areas On the Cibola Wildlife Refuge, Cibola, Arizona
- IV Threatened and Endangered Species Possibly Present Near the Burn Area

PART A - FIRE LOCATION AND BACKGROUND INFORMATION

Fire Name	Cibola Fire
Fire Number	CY55
FWS Region	2
County and State	La Paz, Arizona
Ignition Date/Cause	July 17, 2006 / Lightning Strike
Date Contained	July 21
Date Controlled	July 22
Jurisdiction	FWS 4,662 acres
Other jurisdictions	None
Total Acres	4,662

PART B - NATURE OF PLAN

Type of Action: (check one box below)

<input checked="" type="checkbox"/>	Initial Submission
<input type="checkbox"/>	Amendment to the Initial Submission

PART C – REHABILITATION ASSESSMENT

Much of the area that burned was in saltcedar-dominated habitat interspersed with native species including mesquite and quailbush. Saltcedar root-sprouts vigorously following burning and if not treated, forms dense stands that will typically crowd out native riparian and wetland vegetation. The bare, disturbed soil present over most of the burned area also provides an opportunity for new invasions by saltcedar and several other exotic and noxious plant species (See Section II-4).

Rehabilitation Objectives

- Control spread of invasive, noxious, and exotic species, particularly saltcedar, in order to mitigate future threats to important watershed and wildlife resources, Threatened, Endangered, and Candidate species, and valuable wildlife habitat.
- Assess current site conditions for rehabilitation alternatives to inform future rehabilitation planning and to enhance cost efficient and successful rehabilitation treatments.
- Rehabilitate native vegetation that is more suitable for Threatened and Endangered species, wildlife, watershed and ecosystem function, and less prone to wildfire impacts.

Rehabilitation Approach

Soil types and groundwater hydraulic conditions in southwestern riparian-wetland areas can vary widely over a very small area, making rehabilitation planning and management a challenge. Due to the size of this burned area and the limited refuge staff, a 1,840-acre priority rehabilitation area has been established based on access, environmental conditions, and ground and irrigation water availability. Other governmental and non-governmental partners will be assisting with the rehabilitation efforts outside this priority area including the Bureau of Reclamation and Ducks Unlimited. Baseline environmental conditions will thus be collected throughout the burned area to determine the best alternatives for rehabilitation treatments.

Within the priority area first year BAR treatments will include mechanical treatment of saltcedar, evaluating site conditions, developing site-specific rehabilitation treatment prescriptions, and applying herbicide treatments on saltcedar root-sprouts and noxious weeds. Second and third year BAR treatments will include continued mechanical and herbicide treatments to saltcedar and invasive weeds, further site preparation (e.g. soil amendments, irrigation infrastructure improvements...) and revegetation. The detailed three-year BAR sequence is outlined in Table 1.

The general 3-year Cibola BAR approach is summarized as an iterative five-step management sequence, involving:

- A) Site Preparation;
- B) Site Assessment;
- C) Site Treatment Planning;
- D) Implementation, and;
- E) Treatment Effectiveness Monitoring.

A. Site Preparation

Year 1 (FY '07)

There is a great deal of standing dead saltcedar in the fire-affected area (Photograph 1). This standing biomass limits efficient access to performing cost-effective rehabilitation site assessments and manual herbicide applications to saltcedar root-sprouts and other noxious and exotic weeds. Mechanized equipment will be used to shred, masticate, and mow the standing dead trees to improve access for these activities. This treatment will also knock back saltcedar root-sprouts that emerged after the fire during summer 2006.

Years 2 & 3 (FY's '08 & '09)

Site preparation in second and third year BAR will be guided by site assessment data collected in Year 1 (see Site Assessment below). Site preparation in FY's '08 and '09 will predictably involve improving irrigation water delivery to appropriate zones in the 1840-acre priority area. Site preparation may also involve soil amendments to mitigate saline and sodic soil conditions to facilitate establishment, growth and survival of certain obligate riparian plant communities.



Photo 1. Standing dead saltcedar in the burned area impedes access to conduct site assessments necessary for project implementation.

B. Site Assessment

Year 1 (FY '07)

Revegetation planning will be supported by scientific information. Research in saltcedar-dominated floodplains at Bosque del Apache NWR in Socorro, NM has found that soils data (geomorphology, texture & salinity), groundwater/surface water hydrology and topography are essential for rehabilitation planning (Taylor and McDaniel 1998). We propose to follow this approach through:

1. Performing an Order 1 soil survey and salinity assessment (see Attachment A),
2. Obtaining high-resolution (1 ft. contour) topographic LIDAR data, and
3. Establishing a network of groundwater monitoring wells within the area impacted by the Fire.

C. Site Treatment Planning

Year 1 (FY '07)

The information obtained during the site assessment will be assimilated to develop the most suitable rehabilitation treatment prescriptions. The soils data will be used to determine if soils salinity requires mitigation prior to revegetation and in combination with the groundwater data, will be used to determine appropriate plant species for habitat rehabilitation. Irrigation water could be available to portions of the 1,840-acre priority area (see Figure 2 - Project Area Map), and in combination with the topographic survey and soils data will be used to determine where irrigation could be an effective rehabilitation treatment tool.

D. Implementation

Year 1 (FY '07)

Details of the Implementation Strategy will be finalized during Site Treatment Planning once information is gathered on site conditions. This will be the Refuges primary responsibility and focus for this Year 1 BAR effort. Additional rehabilitation treatments will be undertaken in the adjacent burned areas through in-kind support from U.S. Bureau of Reclamation, Ducks Unlimited, and potentially other governmental organizations and partners.

Years 2 & 3 (FY's '08 & '09)

Implementation activities in FY's '08 and '09 will predictably include continued herbicide applications to saltcedar root-sprouts and herbaceous invasive weeds. We also anticipate the need for applying mechanical saltcedar control treatments within zones slated for irrigation facilitated rehabilitation. Areas that receive flood irrigation may be seeded with cottonwood and willow. Other areas will be revegetated using combinations of drill seeding native grasses and upland shrubs, planting cottonwood poles (rootless), and planting rooted (using "deep-pots") native riparian shrubs.

E. Treatment Effectiveness Monitoring

Monitor the effectiveness of individual and combined treatments for achieving basic resources management objectives will be implemented throughout the three-year BAR project. Most of the monitoring approaches will be informed by results of the Site Assessment and subsequent Site Treatment Planning phases.

Table 1. Proposed Management Sequence

Year	Step	Activities	Timing	Coverage Area
FY '07	Site Preparation	Mowing dead, burned saltcedar	Fall 2006 - Winter 2007	1,840 acres
	Site Assessment	Perform Order 1 Soil Survey, perform soil salinity assessment.	Fall 2006 – Winter 2007	4,662 acres
		Install groundwater observation wells	Fall 2006 – Winter 2007	1,840 acres
		LIDAR (topographic) survey	Winter 2007	4,662 acres
	Site Treatment Planning	Develop treatment plan for Years 2-3	Summer 2007	1,840 acres
	Implementation	Herbicide treatments	Summer-Fall 2007	1,840 acres
	Treatment Effectiveness Monitoring	Saltcedar/noxious weed control	Summer – Fall 2007	1,840 acres
FY '08	Implementation	Root-plow, rake, stack and burn saltcedar roots	Fall 2007 – Summer 2008	500-acres
		Herbicide treatments	Summer–Fall 2008	1,840 acres
		Revegetation	Winter-Spring 2008	500-acres
	Treatment Effectiveness Monitoring	Saltcedar/noxious weed control, other	Winter– Fall 2008	1,840 acres
		Revegetation	Summer-Fall 2008	500-acres
FY '09	Site Preparation	Soil amendments	Fall 2008 – Winter 2009	500-acres
		Irrigation delivery improvements	Fall 2008 – Winter 2009	1,840 - acres
	Implementation	Revegetation	Winter – Summer 2009	1,340 acres
	Treatment Effectiveness Monitoring	Saltcedar/noxious weed control	Winter – Fall 2009	1,840 acres
		Revegetation	Summer–Fall 2009	1,840 acres

PART D – BAR TEAM RESOURCE ADVISORS

Position	Team Member (Agency)
Team Leaders, Fire and Rehabilitation Specialists	Todd Caplan, Senior Ecologist, Parametrix Mark Kaib, Fire Ecologist, U.S. FWS, Region 2
Operations and Implementation	Bill Seese, Cibola NWR Manager
Endangered Species Coordinator	Lesley Fitzpatrick, Ecological Services, Phoenix
Wildlife Biologist	Steven Albert, Senior Wildlife Biologist, Parametrix
GIS Specialist	Chad McKenna, GIS Specialist, Parametrix
Plan Editing	Debbie Fetherston, Technical Editor, Parametrix
Invasive Species	April Fletcher, Region 2 Invasive Species Coordinator, Leonard LeCaptain, Invasive Species Task Force Leader
Resource Advisors	Adan Gandaria, Wildlife Biologist, Cibola NWR Andrew Hautzinger, Hydrologist, U.S. FWS, Region 2 Darrell Kundargi, Hydrologist, U.S. FWS, Region 2

PART E - SUMMARY OF TREATMENTS, ACTIVITIES AND COSTS

The summary of treatments and activities in cost table below identifies costs charged or proposed from sub-activity 9262 funding sources.

Spec #	Title	Unit	Unit Cost	# of Units	Work Agent	Cost
1	Salt Cedar control-mechanical	Acre	\$478.80	1,840 ac	FA, SC	\$881,000
2	Saltcedar control-herbicide	Acre	\$299.54	1,840 ac	FA, SC	\$551,156
3	Soil Surveys	Acre	\$31.72	4,662 ac	FA, SC	\$147,878
4	Topographic Survey (LIDAR)	Acre	\$2.36	4,662 ac	FA, SC	\$11,000
5	Groundwater Assessment	Well	\$2,713.00	25 wells	FA, SC	\$67,825
6	Rehabilitation Planning Technical Support	Hour	\$124	600	FA, SC	\$74,400
7	BAER Implementation Leader	Year	\$62,400	1	FA, SC	\$62,400
8	Revegetation	Acre	\$815.22	1840 ac	FA,SC	\$1,500,000
9	Treatment Effectiveness Monitoring	Acre	\$43.48	1840 ac	FA,SC	\$80,000
TOTAL						\$3,375,659
Work Agent: FA=Force Account, G=Grantee, SC=Service Contract						

PART F - INDIVIDUAL SPECIFICATION - MECHANICAL TREATMENTS (1)

TREATMENT/ACTIVITY NAME	Mechanical Treatment	PART E SPECIFICATION #	1
NFPORS TREATMENT CATEGORY*	Other Treatment	FISCAL YEAR(S) (list each year):	2007, 2008
NFPORS TREATMENT TYPE *	Mechanical	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Mechanically treat Salt Cedar</p> <p>B. Location/(Suitable) Sites: 1840 acres of burned saltcedar monoculture within Cibola Fire perimeter.</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> 1. Mow standing dead saltcedar biomass and 1st year post-fire saltcedar root sprouts (FY '07) 2. Root-plow, rake and stack saltcedar roots (FY '08). <p>D. Purpose of Treatment Specifications: Reduce standing dead biomass in FY '07 to allow efficient and cost-effective access for performing herbicide applications (see Specification 2), performing soils surveys (see Specification 3) and installing groundwater monitoring wells (see Specification 5). Plow, rake, stack and burn saltcedar roots in approximately 500-acres slated for flood irrigation management in FY '08.</p> <p>E. Treatment Effectiveness Monitoring Proposed: Visual inspection to ensure goals of improving site access are achieved.</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item):	COST / ITEM
Do not include contract personnel costs here (see contractor services below).	
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note:	COST / ITEM
Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Saltcedar mowing - \$275/ac x 1840 ac.;	\$506,000
Root plow, rake and stack saltcedar roots - \$750/acre x 500 ac	\$375,000
TOTAL CONTRACT COST	\$881,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	10/01/2006	2/28/2007	S	1840 ac	\$275/ac	Mow standing-dead saltcedar	\$506,000
FY08	10/01/2007	2/28/2008	S	500 ac	\$750/ac	Remove Salt Cedar roots	\$375,000
TOTAL							\$881,000

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 1 independent contractual source.	C
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

C = Contract

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS - Cibola NWR	1840 ac	\$881,000
	TOTAL COST	\$881,000

PART F - INDIVIDUAL SPECIFICATION - HERBICIDE TREATMENTS (2)

TREATMENT/ACTIVITY NAME	Herbicide Treatments	PART E SPECIFICATION #	2
NFPORS TREATMENT CATEGORY*	Other Treatment	FISCAL YEAR(S) (list each year):	2007, 2008, 2009
NFPORS TREATMENT TYPE *	Chemical	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Spot treat Salt Cedar root-sprouts with herbicide following mechanical treatments</p> <p>B. Location/(Suitable) Sites: 1840-acre floodplain areas within Cibola-fire perimeter.</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> 1. Use ATV mounted herbicide sprayer tank to spot treat Saltcedar root-sprouts in 1840-acre priority area. 2. Apply appropriate herbicides to all Saltcedar root-sprouts during late summer-early fall 2007. Funding is currently requested for FY'07 but this treatment should be continued for three years to ensure adequate root-sprout control. <p>D. Purpose of Treatment Specifications: Ensure adequate control of Saltcedar regrowth and new saltcedar plant invasions of the 1840-acre project area.</p> <p>E. Treatment Effectiveness Monitoring Proposed: Visual inspection following procedures specified in Long-Term Vegetation Management Plan (Version-4); Havasu NWR. (see Specification #9).</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item):	COST / ITEM
Do not include contract personnel costs here (see contractor services below).	
Four laborers GS 5 @ \$14.50/hr x 960 hr/yr x 1 six-month growing season x 3 years	\$167,040
TOTAL PERSONNEL SERVICE COST	\$167,040
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note:	COST / ITEM
Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Two ATVs with two 12 volt, 25 gal sprayer tanks	\$15,000
Gasoline for ATV's @ \$3.50/gallon x 5/gal. tank x 1 tank/day x 2 ATV's x 120 days x 1 years	\$12,600
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$27,600
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Garlon 4 herbicide and Adjuvants @ (\$93/gal herbicide +\$6.66/gal veg. oil) x 1,840 gal (assumes 1 gal of 50% solution per acre) x 1 applications x 1 year (2007). Herbicide volume and cost will be incrementally reduced by 33% over the next 2 years (2008 = 1214 gal; 2009 = 607 gal.)	\$364,916
TOTAL MATERIALS AND SUPPLY COST	\$364,916
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	05/01/07	09/30/07	F	1,840	140.35	Purchase Equipment; Control Salt Cedar	\$258,255
FY08	05/01/08	09/30/08	F	1,840	96.03	Control Salt Cedar	\$176,707
FY09	05/01/09	7/29/2009	F	1,840	63.15	Control Salt Cedar	\$116,194
TOTAL							\$551,156

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 2-3 independent contractual sources.	M
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	E
4.	Estimates based upon government wage rates and material cost.	P
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	1840 ac	\$551,156
	TOTAL COST	\$551,156

PART F - INDIVIDUAL SPECIFICATION - REHABILITATION PLANNING (3)

TREATMENT/ACTIVITY NAME	Soil Survey	PART E SPECIFICATION #	3
NFPORS TREATMENT CATEGORY*	Assessment	FISCAL YEAR(S) (list each year):	2007
NFPORS TREATMENT TYPE *	Species/habitat inventory	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Collect soils information required for developing rehabilitation plan</p> <p>B. Location/(Suitable) Sites: 4,662-acre burned area within Cibola NWR</p> <p>C. Design/Construction Specifications:</p> <p>1. Perform Order-1 Soil Survey (see Appendix III for detailed description of soil survey methods).</p> <p>2. Perform Soil Salinity Assessment (see Appendix III for detailed description of soil salinity assessment methods).</p> <p>D. Purpose of Treatment Specifications: Gather essential information required for site rehabilitation planning</p> <p>E. Treatment Effectiveness Monitoring Proposed: n/a</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Soil Assessment @ \$31.72/ac x 4662 ac	\$147,878
TOTAL CONTRACT COST	\$147,878

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	10/01/2006	02/28/2007	S	4,662 ac	\$31.72	Order-1 Soil Survey and Soil Salinity assessment	\$147,878
TOTAL							\$147,878

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 1 independent contractual source.	C
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	4,662 ac	\$147,878
	TOTAL COST	\$147,878

PART F - INDIVIDUAL SPECIFICATION - TOPOGRAPHIC SURVEY (LIDAR) (4)

TREATMENT/ACTIVITY NAME	Topographic Survey (LIDAR)	PART E SPECIFICATION #	4
NFPORS TREATMENT CATEGORY*	Assessment	FISCAL YEAR(S) (list each year):	2007
NFPORS TREATMENT TYPE *	Species/habitat inventory	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Collect topographic information required for developing rehabilitation plan</p> <p>B. Location/(Suitable) Sites: Entire 4,662 area within the Cibola Fire burned perimeter.</p> <p>C. Design/Construction Specifications:</p> <p>1. Perform high resolution topographic survey (LIDAR) throughout the entire burned area to support short and long-term fire rehabilitation planning efforts.</p> <p>D. Purpose of Treatment Specifications: Gather essential information required for site rehabilitation planning</p> <p>E. Treatment Effectiveness Monitoring Proposed: n/a</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
LIDAR survey, 4662-acres, 1 ft contour intervals = \$6000 mobilization + \$5000 processing = \$11,000	\$11,000
TOTAL CONTRACT COST	\$11,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	10/01/2006	02/28/2007	S	4,662 ac	\$2.36	Detailed (1-ft. resolution) topographic surveys (LIDAR)	\$11,000
TOTAL							\$11,000

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 1 independent contractual source.	C
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	4,662 ac	\$11,000
	TOTAL COST	\$11,000

PART F - INDIVIDUAL SPECIFICATION - GROUNDWATER ASSESSMENT (5)

TREATMENT/ACTIVITY NAME	Groundwater Assessment	PART E SPECIFICATION #	5
NFPORS TREATMENT CATEGORY*	Assessment	FISCAL YEAR(S) (list each year):	2007
NFPORS TREATMENT TYPE *	Species/habitat inventory	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Monitor groundwater levels to support developing rehabilitation plan</p> <p>B. Location/(Suitable) Sites: 1840 acres of burned saltcedar within the Cibola Fire perimeter.</p> <p>C. Design/Construction Specifications:</p> <p>1. Monitor and map groundwater levels to assist rehabilitation planning. Establish five transects with 5 groundwater observation wells. Automate data collection using pressure transducers.</p> <p>D. Purpose of Treatment Specifications: Gather essential information required for site rehabilitation planning</p> <p>E. Treatment Effectiveness Monitoring Proposed: n/a</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Twenty-five 2-inch galvanized pipe x 35 ft. @ \$450 ea.	\$11,250
Twenty-five In-situ L1 Troll 500 transducers & data loggers @ \$1000 ea.	\$25,000
Twenty-five 30-ft. cables @ \$400 ea.	\$10,000
One troll com download port @ \$325 ea.	\$325
TOTAL MATERIALS AND SUPPLY COST	\$46,575
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Well Driller Install 25 groundwater observation wells @ \$850/well	\$21,250
TOTAL CONTRACT COST	\$21,250

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	10/01/2006	12/15/2006	S	25 wells	\$2,713	Install and automate 25 groundwater observation wells	\$67,825
TOTAL							\$67,825

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 1 independent contractual source.	M
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	M
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	25 wells	\$67,825
	TOTAL COST	\$67,825

PART F - INDIVIDUAL SPECIFICATION - REHABILITATION PLANNING TECHNICAL SUPPORT (6)

TREATMENT/ACTIVITY NAME	Rehabilitation Planning Technical Support	PART E SPECIFICATION #	6
NFPORS TREATMENT CATEGORY*	Planning	FISCAL YEAR(S) (list each year):	2007, 2008, 2009
NFPORS TREATMENT TYPE *	Consultation	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Synthesize site assessment information (LIDAR, soils assessments, water table data) to develop rehabilitation strategy.</p> <p>B. Location/(Suitable) Sites: 1840 acre priority area within the Cibola Fire perimeter.</p> <p>C. Design/Construction Specifications:</p> <p>1. Contract technical support to assist with rehabilitation planning efforts. Contractor will have expertise in southwestern riparian-wetland rehabilitation and irrigation design and management. Detailed scope of work will be developed by BAER Implementation Leader once site assessment results have been obtained.</p> <p>D. Purpose of Treatment Specifications: Obtain technical expertise to support BAER Implementation Leader and USFWS Region 2 staff in developing and implementing scientifically based rehabilitation treatment prescriptions.</p> <p>E. Treatment Effectiveness Monitoring Proposed: n/a</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item):	COST / ITEM
Do not include contract personnel costs here (see contractor services below).	
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note:	COST / ITEM
Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Senior Ecologist/Soil Scientist @ \$124/hr x 200 hours = \$24,800 x 3 years	\$74,400
TOTAL CONTRACT COST	\$74,400

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	05/01/2007	09/30/2007	S	200 hours	\$124	Technical support for rehabilitation planning	\$24,800
FY08	10/01/2007	06/30/2008	S	200 hours	\$124	Technical support for rehabilitation planning	\$24,800
FY09	10/01/2008	7/29/2009	S	200 hours	\$124	Technical support for rehabilitation planning	\$24,800
TOTAL							\$74,400

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 1 independent contractual source.	C
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	1840-acres	\$74,400
	TOTAL COST	\$74,400

PART F - INDIVIDUAL SPECIFICATION - BAER IMPLEMENTATION LEADER (7)

TREATMENT/ACTIVITY NAME	BAER Implementation Leader	PART E SPECIFICATION #	7
NFPORS TREATMENT CATEGORY*	Administration	FISCAL YEAR(S) (list each year):	2007, 2008, 2009
NFPORS TREATMENT TYPE *	Contract administration	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Implement BAER Plan tasks</p> <p>B. Location/(Suitable) Sites: Cibola Fire, Cibola NWR</p> <p>C. Design/Construction Specifications: n/a</p> <p>D. Purpose of Treatment Specifications: Ensure implementation of BAER Rehabilitation Plan</p> <p>E. Treatment Effectiveness Monitoring Proposed: n/a</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
GS 12 @ \$30/hr x 4 mo. X 3 yr	\$62,400
TOTAL PERSONNEL SERVICE COST	\$62,400
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY07	10/01/2006	09/30/2007	F	1 yr	\$20,800	Implement BAER Plan	\$20,800
FY08	10/01/2007	09/30/2008	F	1 yr	\$20,800	Implement BAER Plan	\$20,800
FY09	10/01/2008	7/29/2009	F	1 yr	\$20,800	Implement BAER Plan	\$20,800
TOTAL							\$62,400

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 2-3 independent contractual sources.	
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	P
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, E = Equipment M = Materials/Supplies, T = Travel, C = Contract, F = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	N/A	\$62,400
	TOTAL COST	\$62,400

PART F - INDIVIDUAL SPECIFICATION - REVEGETATION (8)

TREATMENT/ACTIVITY NAME	Revegetation	PART E SPECIFICATION #	8
NFPORS TREATMENT CATEGORY*	Wildlife Habitat	FISCAL YEAR(S) (list each year):	2008, 2009
NFPORS TREATMENT TYPE *	Terrestrial Habitat Improvement	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Revegetate 1840-ac. Priority area with diverse native riparian-wetland and upland plant species.</p> <p>B. Location/(Suitable) Sites: Cibola Fire, Cibola NWR</p> <p>C. Design/Construction Specifications: Revegetation guided by results from Specifications #3, 4, 5 & 6 will be implemented in FY 2008 and 2009. Anticipated revegetation includes 1) seeding native, site-adapted upland grass and shrub species; 2) planting potted shrubs in limited areas and watering with drip irrigation or other methods; 3) planting rootless tree pole cuttings, and; 4) seeding native riparian species and applying flood irrigation.</p> <p>D. Purpose of Treatment Specifications: Rehabilitate 1840-ac. Priority area with a diverse mix of local, site-adapted plant species.</p> <p>E. Treatment Effectiveness Monitoring Proposed: see Specification #9</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
Generalized costs for plant seed, performing seeding; planting rooted and rootless stock; irrigation system improvements.	\$1,500,000
TOTAL CONTRACT COST	\$1,500,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY08	10/01/2007	09/30/2008	S	1840 ac	\$407.61	Implement BAER Plan	\$750,000
FY09	10/01/2008	7/29/2009	S	1840 ac	\$407.61	Implement BAER Plan	\$750,000
TOTAL							\$1,500,000

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 2-3 independent contractual sources.	
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	M
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	N/A	\$1,500,000
	TOTAL COST	\$1,500,000

PART F - INDIVIDUAL SPECIFICATION - TREATMENT EFFECTIVENESS MONITORING (9)

TREATMENT/ACTIVITY NAME	Treatment Effectiveness Monitoring	PART E SPECIFICATION #	9
NFPORS TREATMENT CATEGORY*	Monitoring	FISCAL YEAR(S) (list each year):	2008, 2009
NFPORS TREATMENT TYPE *	Treatment Effectiveness Monitoring	WUI? Y / N	
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>Number and Describe Each Task:</p> <p>A. General Description: Revegetate 1840-ac. Priority area with diverse native riparian-wetland and upland plant species.</p> <p>B. Location/(Suitable) Sites: Cibola Fire, Cibola NWR</p> <p>C. Design/Construction Specifications: Herbicide monitoring performed via visual inspection following procedures specified in Long-Term Vegetation Management Plan (Version-4); Havasu NWR. Revegetation monitoring methods will be developed following results from Specifications #3, 4, 5 & 6. Revegetation monitoring will be implemented in FY 2008 and 2009 (see Specification #8).</p> <p>D. Purpose of Treatment Specifications: Rehabilitate 1840-ac. Priority area with a diverse mix of local, site-adapted plant species.</p> <p>E. Treatment Effectiveness Monitoring Proposed: Herbicide monitoring performed via visual inspection following procedures specified in Long-Term Vegetation Management Plan (Version-4); Havasu NWR. Revegetation monitoring will involve both qualitative (e.g. photopoints) and quantitative monitoring of revegetation treatment effectiveness.</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
General costs for implementing qualitative and quantitative monitoring (\$40,000/yr x 2 yrs) = \$80,000	\$80,000
TOTAL CONTRACT COST	\$80,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY08	10/01/2007	09/30/2008	S	1840 ac	\$21.74	Implement BAER Plan	\$40,000
FY09	10/01/2008	7/29/2009	S	1840 ac	\$21.74	Implement BAER Plan	\$40,000
TOTAL							\$80,000

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 2-3 independent contractual sources.	
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	C
4.	Estimates based upon government wage rates and material cost.	
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURISDICTION

JURISDICTION	UNITS TREATED	COST
USFWS – Cibola NWR	N/A	\$80,000
	TOTAL COST	\$80,000

PART G - POST- BURNED AREA REHABILITATION REQUIREMENT

The following are post-burned area rehabilitation, implementation, operation, maintenance, monitoring, and evaluation actions after three years from the control of the fire to ensure the effectiveness of initial investments. Estimated annual cost and funding source is indicated.

Continued Long-Term Monitoring of Treatment Effectiveness

Maintenance of Integrated Invasive Species Management Herbicide Treatments

Restoration of native species assemblages through plantings and seeding

PART H – CONSULTATIONS/CONTACT INFORMATION

Bill Seese, Refuge Manager
U.S. Fish and Wildlife Service
Cibola National Wildlife Refuge
Route 2, Box 138
Cibola, AZ 85328
928-857-3253

Adan Gandaria, Wildlife Biologist
Cibola National Wildlife Refuge
Route 2, Box 138
Cibola, AZ 85328
928-857-3253

Mark Kaib, Fire Ecologist
U.S. Fish & Wildlife Service, Region 2
500 Gold Street
Albuquerque, NM 87103
505-248-6819

Lesley Fitzpatrick, Endangered Species Coordinator
U.S. Fish & Wildlife Service, Region 2
2321 West Royal Palm Road, Suite 103
Phoenix, AZ 85021
602-242-0210 x 236

Andrew Hautzinger, Hydrologist
U.S. Fish & Wildlife Service, Region 2
500 Gold Street
Albuquerque, NM 87103
505-248-7946

APPENDIX I

BURNED AREA ASSESSMENT REPORT CIBOLA FIRE (AZ-CRB-061278)

Prepared by Parametrix
August 8, 2006

I. Objectives

The objectives of this burned area assessment are:

- Report background information on the fire, including the cause, fuels, and impacts to infrastructure and cultural resources.
- Create an accurate map of the area affected by the fire.
- Discuss the site history and land use.
- Determine the fire's impacts to vegetation, wildlife and other natural resources, including rare, Threatened, Endangered, and Candidate species.
- Compile site characteristics pertinent to burned area rehabilitation treatments.
- Provide specific recommendations for burned area rehabilitation, monitoring, and management of natural resources at the site.
- Estimate costs associated with the recommended specifications.

II. Background Information and Site Description

1. Cibola Fire Background

The Cibola Fire began at approximately 2:00 a.m. on July 17, 2006 in the northern portion of the Cibola National Wildlife Refuge (Figure 2), as the result of a lightning strike. Fire crews were dispatched at 11:00 p.m. on July 18 and arrived on the morning of July 19. Dense dry fuel, hot temperatures (daytime highs of up to 115F), low humidity (< 20%), and winds of 10-15 mph contributed to a spread rate of up to 2,640' per day and flame lengths of up to 100', though spot fires were generally short range. Ground crews were supported with fixed wing and helicopter crews that dropped water and fire retardant. The fire was contained on July 21 and controlled on July 22. Infrastructure that was damaged included wood power poles. Several structures were threatened but were ultimately undamaged. The fire burned 4,662 acres with an estimated suppression cost of 2 million. Approximately 200 acres of emergent marsh vegetation, excellent wildlife habitat, were burned in the fire. However, this type of vegetation readily re-sprouts after a fire and is expected to recover on its own within 3 years with very little active management.

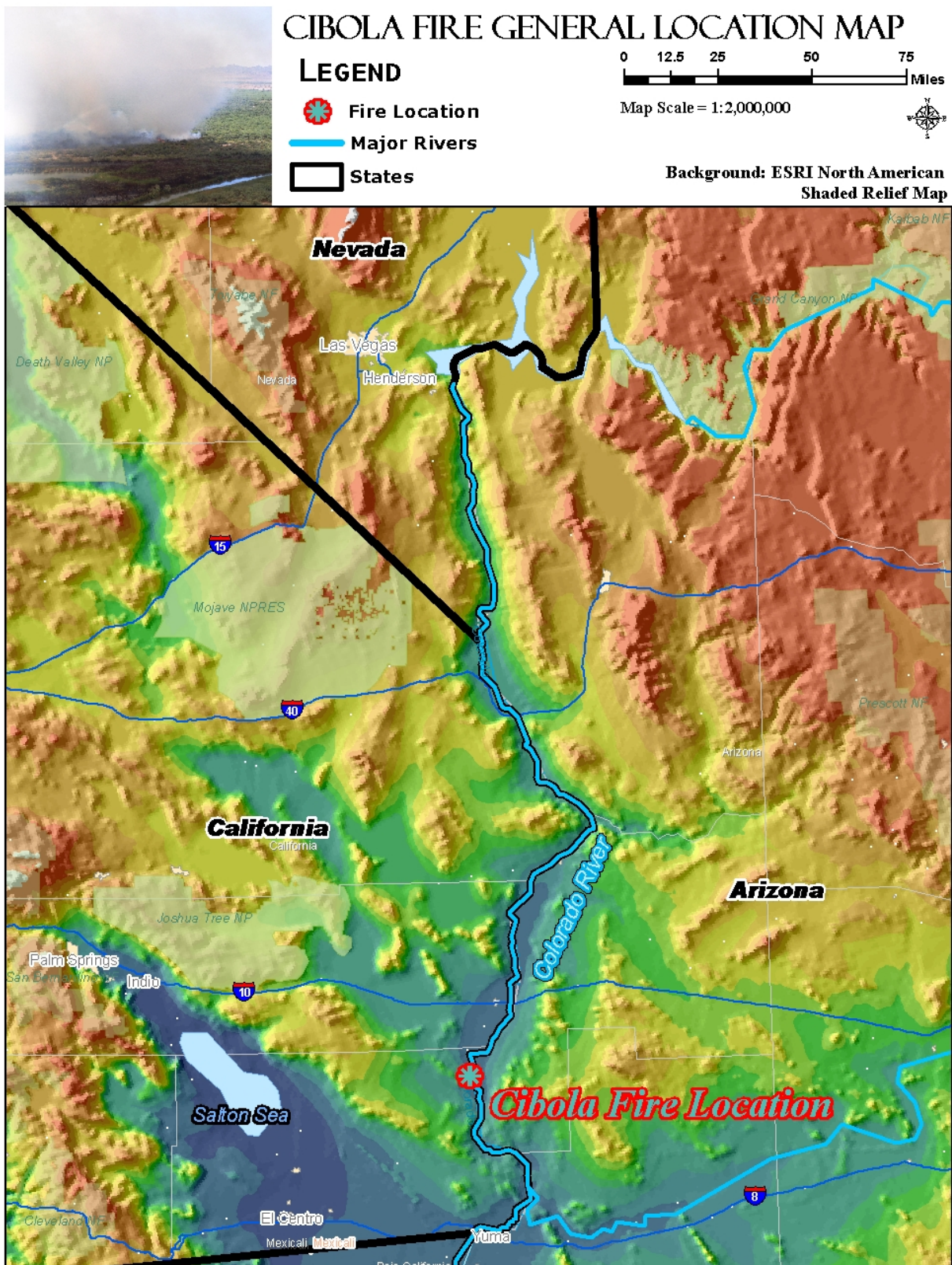


Figure 1. Location of the Cibola Fire

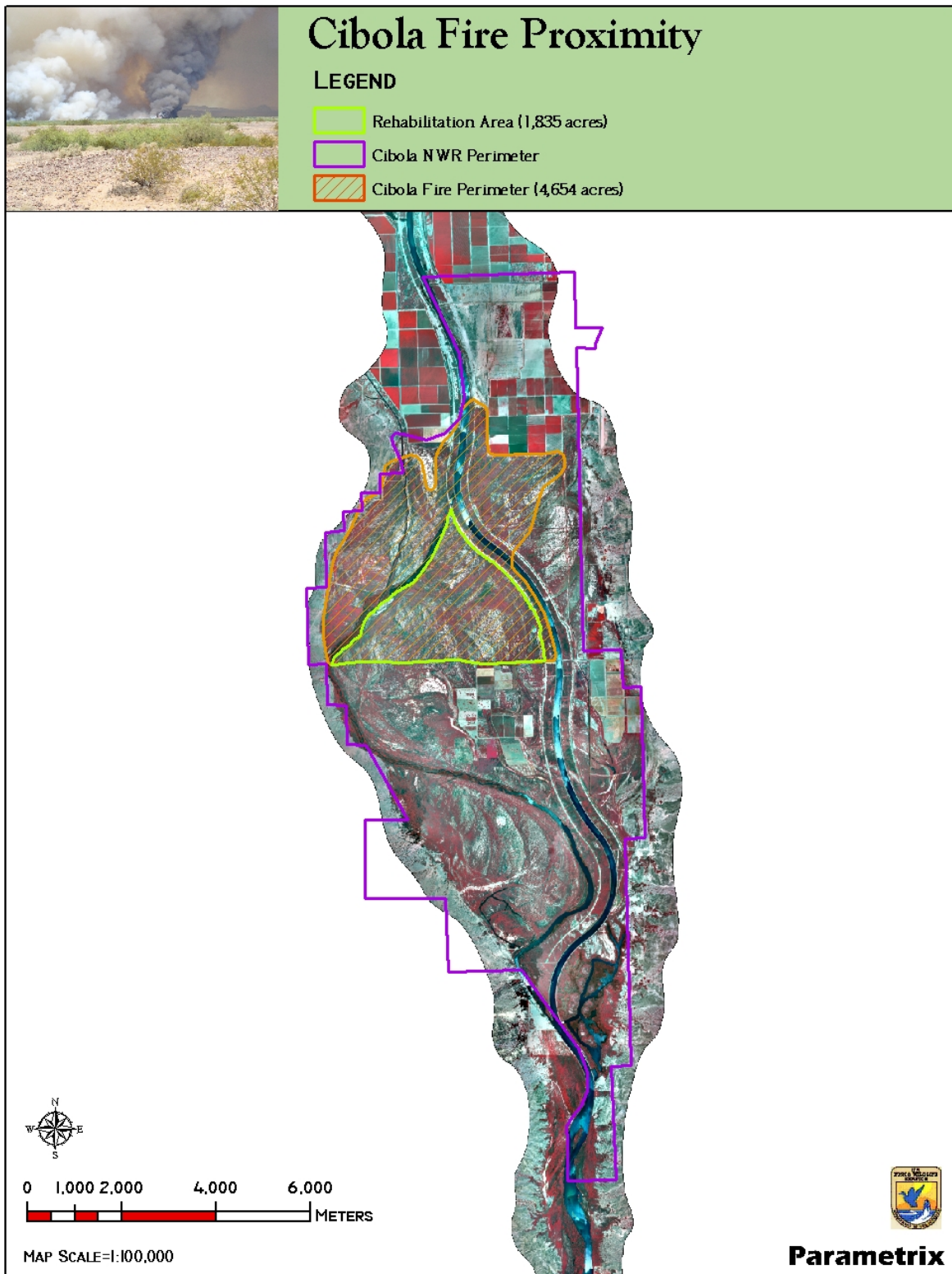


Figure 2. Cibola Fire and surrounding area.

2. Site Description

The lower Colorado River Valley is an area of widely separated short mountain ranges and desert plains. It is generally considered a subsection of the Basin and Range geomorphic province. Soils through the region include Aridisols and Entisols with very warm temperature and arid moisture regimes. Soils within the area of the burn consist of a variety of silt loams and silt clays, sands, and sandy loams, which are varying age deposits of the Colorado River (Figure 3).

The 17,000 acre Cibola National Wildlife Refuge (NWR), located approximately 20 miles south of Blythe, California (Figures 1 and 2). The Refuge was established in 1964 to provide habitat for wildlife, especially migratory birds. In total, nearly 300 species of birds have been recorded on the refuge. The climate of the area is extremely arid, ranging from an average low of 39.2F in December to an average high of 108.5F in July. High temperatures occasionally exceed 120F. Annual precipitation is less than 3 inches per year, with the most rainfall coming in February and August.

Prior to the fire, the site was characterized by generally flat abandoned floodplain terrain. The site was dominated by 8-20 foot tall saltcedar trees, though other types of vegetation were burned as well (Table 2).

Table 2. Vegetation Types of Pre-burn area

Vegetation Type	Acres	% of Burn Area
Agricultural Land	9	0.2
Arrowed	270	5.8
Backwater	74	1.6
Sparse Intermediate Aged Cottonwood-Willow	42	0.9
Cattail/Bulrush Marsh	89	1.9
Lower Colorado River	135	2.9
Dense Intermediate Aged Saltcedar	158	3.4
Sparse Intermediate Aged Saltcedar	2,583	55.5
Dense Young Saltcedar	592	12.7
Dense Young Saltcedar-Honey Mesquite	36	0.8
Dense Young Saltcedar-Screwbean Mesquite	548	11.8
Undeveloped	87	1.9
No Classification	30	0.6
Grand Total	4,654	100.0

Adjacent to the burn site, the site contained widely spaced native mesquite, creosote bush, and palo verde, and grasses.

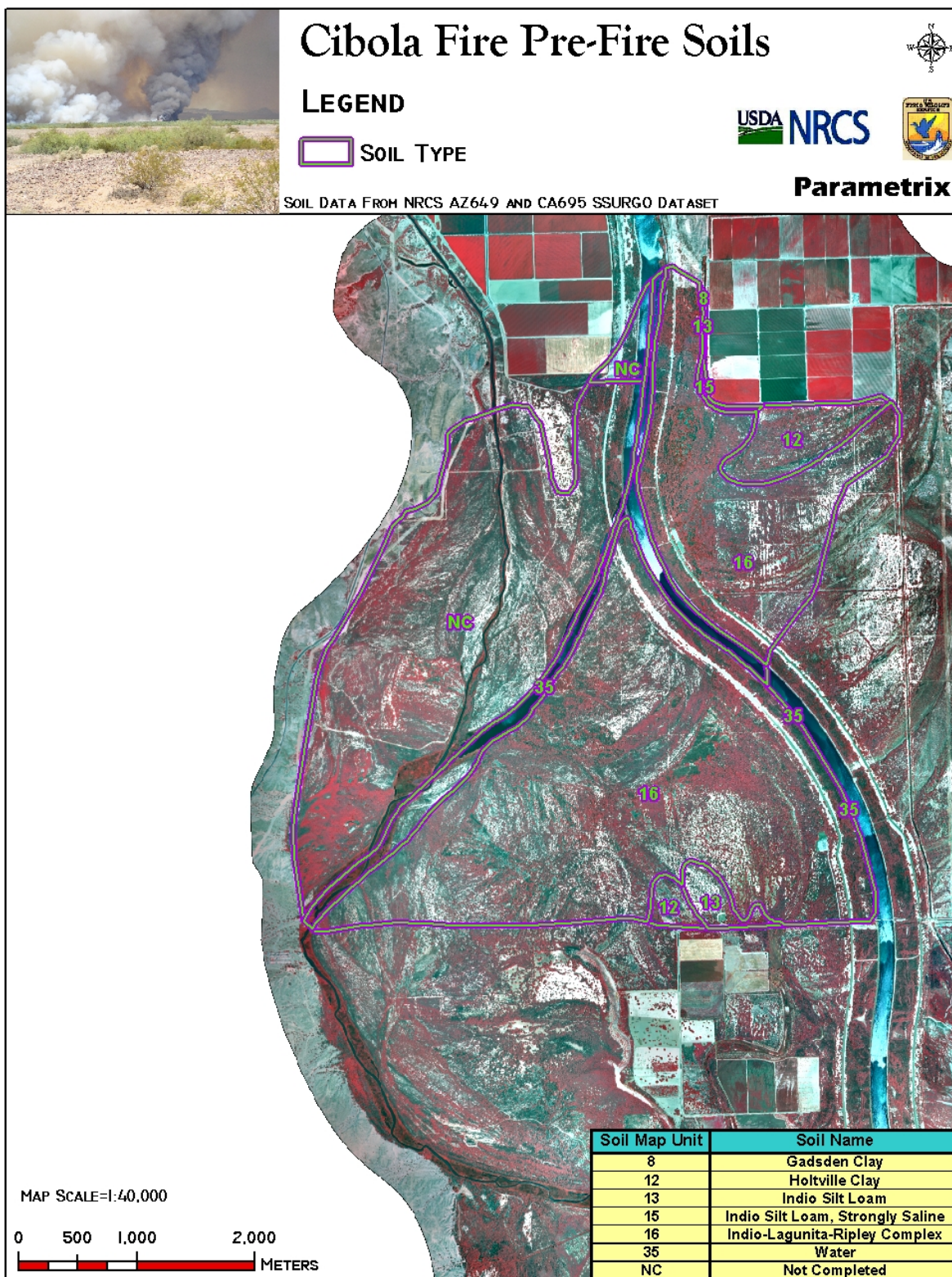


Figure 3. Soils of the Cibola Burn and surrounding area.

3. Land Use and Land Management in the Area of the Fire

Preceding the fire, the Cibola fire burned area was being actively managed for upland migratory birds, waterfowl and other native wildlife species, including areas that provided habitat for the Endangered Yuma clapper rail. One constraint on the refuge for restoration is limited irrigation infrastructure. There is an east-west trending irrigation canal located along the southern boundary of the burn perimeter, but there are currently no lateral irrigation ditches extending north or south of this main canal. Consequently, most of the Refuge's restoration and habitat management activity is taking place in other parts of the refuge where irrigation infrastructure is well established.

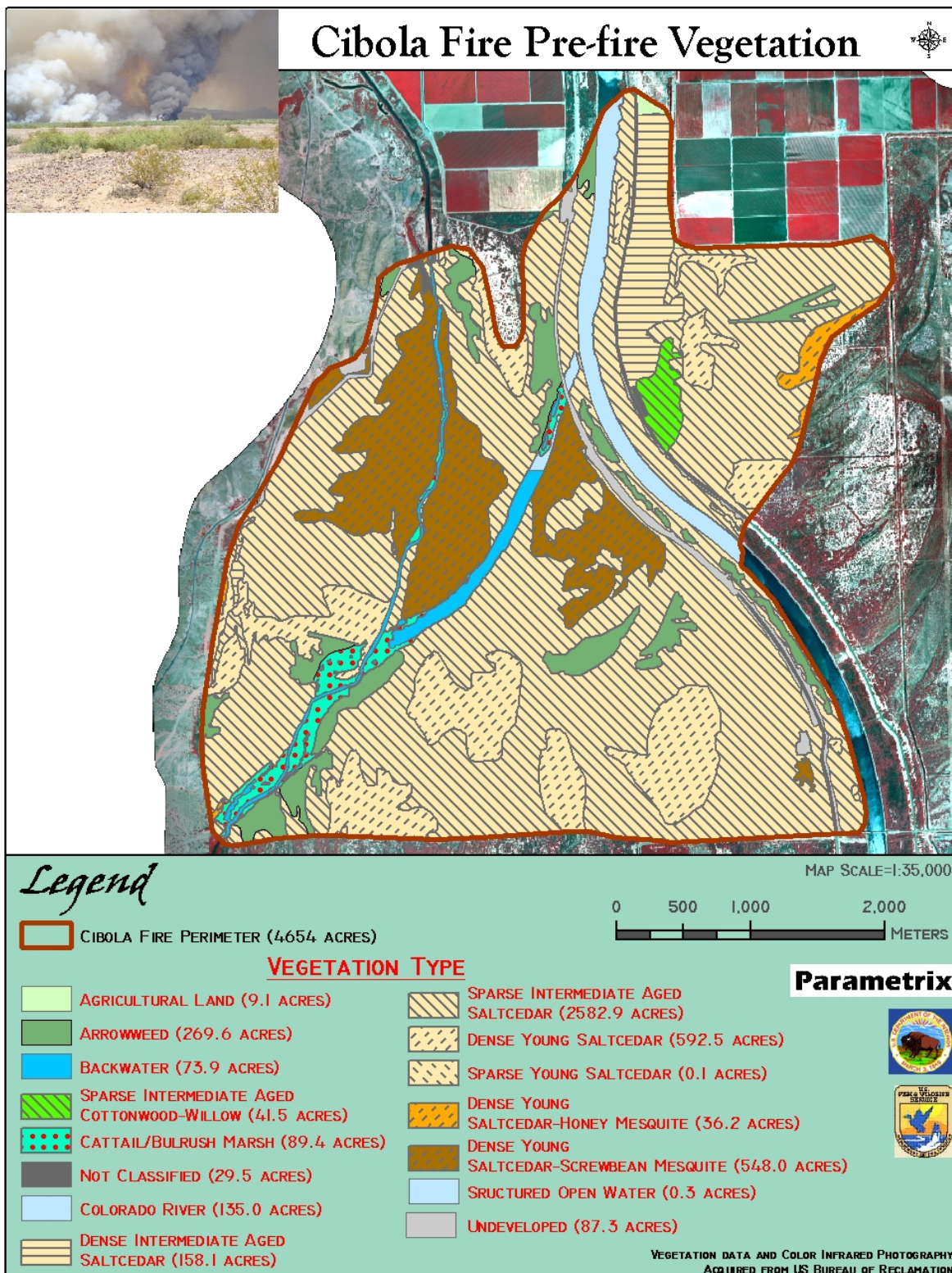


Figure 4. Pre-fire vegetation at the Cibola burn.

4. Impacts to Natural, Cultural and Historic Resources

Impacts to Vegetation and Wildlife Habitat

The majority of the burn area (55.5%) burned in sparse, intermediate aged saltcedar. In total, more than 84% of the vegetation burned was either dominated by or contained a significant component of saltcedar. This is important because the refuge and other land managers along the Lower Colorado River are actively managing the removal of saltcedar, a non-native introduced weed that replaces native riparian vegetation and decreases the value of habitat for many native species of wildlife, including two federally-endangered birds, the Southwestern willow flycatcher (USFWS 2005) and the Yuma Clapper Rail (*Rallus longirostris yumanensis*), and one Candidate Species, the yellow-billed cuckoo (*Coccyzus americanus*). Although Critical Habitat has been designated for the willow flycatcher, the Refuge and adjacent lands are excluded from this designation due to the implementation of the Lower Colorado River Multi-Species Conservation Plan (US Bureau of Reclamation 2004), a comprehensive management plan aimed at promoting the recovery of listed species along the Lower Colorado River.

Refuge personnel and contractors actively manage for these species on the refuge, including conducting field surveys to track populations, and developing habitat restoration plans. In addition, the refuge manages a small reservoir, High Levee Pond, for rearing of two federally endangered fish, the bonytail (*Gila elegans*) and the razorback sucker (*Xyrauchen texanus*). The fire burned vegetation surrounding the High Levee Pond, and fire retardant was sprayed in the vicinity, though it is uncertain what effect, if any, this had on water quality (Photos 2 & 3). Fortuitously the fish had been trapped and transported out of this pond recently in anticipation of applying rotenone to eliminate non-native fish. Without treatment, saltcedar and other weeds are expected to aggressively recolonize the burn site.



Photos 2 and 3. High Levee Pond.

Impacts to Threatened and Endangered Wildlife

Although comprehensive surveys had not been conducted over the entire burn area, several Threatened, Endangered, and rare wildlife were known to be present in or very near the burn (Appendices B).

The **Southwestern willow flycatcher** is an endangered migrant songbird that inhabits thick moist, multi-storied riparian vegetation in the arid Southwestern United States. Critical Habitat has been designated for this species; however, the Lower Colorado River was excluded from the designation due to the existence of the Lower Colorado River Multi-Species Conservation Program. This comprehensive, multi-agency program is striving to protect and restore habitat for listed species along the Lower Colorado River. Most of the willow flycatcher nests on the refuge are on the southern portion of the refuge and were not affected by the fire.

Another federally-endangered species, the **Yuma Clapper Rail**, is present on the refuge near the area that burned. In 2005, there were approximately 8 nests in this area of the 82 recorded nesting areas on the Refuge (L. Fitzpatrick, USFWS pers. comm.). Critical habitat has not been designated for the Yuma clapper rail. Marsh habitats for the Yuma clapper rail are a limited component of the entire Refuge. Approximately xx% of the available habitat was affected by the fire.

The **bald eagle** (*Haliaeetus leucocephalus*) (federally Threatened) is also present along the Colorado River through this reach. The fire is not expected to have significant negative impacts to this species or its habitat. Any stabilization or rehabilitation of the site, especially it involves improvement of riparian habitat, will benefit this species.

The **yellow-billed cuckoo** is also present on the Refuge. There is habitat for this species present in the northern end of the refuge, possibly quite near the fire, but no individuals were detected during the latest year of surveys. It is unlikely that the area that actually burned provided suitable habitat for this species.

Two federally endangered fish, the **bonytail** and the **razorback sucker** have in the past been reared in High Levee Pond (need to map where High Levee Pond is in relation to the burn). Because the vegetation surrounding the pond burned, some fire retardant may have affected the pond's water quality (A. Gandaria, USFWS pers. comm.) However, the fish were recently trapped and removed from the pond in anticipation of applying rotenone to the pond to remove non-native fish. Due to reintroduction efforts for the razorback sucker in this portion of the LCR, there may be razorback suckers in the mainstem LCR and in the old river channel that could have been affected by the fire or fire suppression activities. This probability is slight due to the low population numbers of razorback suckers estimated for this area. Temporary effects to water quality are not likely to have affected the constituent elements of Critical Habitat

Impacts from Weed Invasion

Several noxious weeds are present in Yuma County and spreading in areas surrounding the burn site. With the surface vegetation greatly denuded after the fire, the bare, disturbed soil presents opportunity for encroachment by several noxious weed species. Given the flammability of some prevalent species (particularly saltcedar) and the danger that weeds pose to hinder habitat restoration, weed control is an essential factor in emergency site rehabilitation. Special attention should be focused on the species listed below (LeCaptain, Fletcher, pers. comm.).

Camelthorn (*Alhagi mauroru*)

Camelthorn is an intricately branched, somewhat woody herb with extensively developed underground roots. In the spring, thick rhizomes spread in all directions from the parent plant. One of the most common ways in which camelthorn is spread is through livestock grazing, though this is likely not a problem on the refuge itself. Preventative measures such as locally promoting the use of certified weed-free hay, not allowing livestock to eat and thus disperse the seeds, and not allowing the spread of seed through the use of heavy equipment in land manipulation of infested areas are recommended. The prevention of new infestations of camelthorn is the best and most inexpensive method of control. Mechanical control by itself is often ineffective unless it treats both above and below ground portions of the plant.

Several herbicides have been to control camelthorn. Preferred herbicides are metsulfuron methyl (Escort), and imazapyr (Arsenal). Escort is applied at 1-3% concentration with water as a foliar application with a backpack sprayer. Arsenal can also be used, applied as a targeted application to the plants at a 1 to 2 percent concentration using a backpack sprayer, though caution needs to be taken to avoid non-target spraying.. Treatment of resprouts will be needed as the plant begins to resprout due to camelthorn's very deep root system (up to 35-40 feet in some places).

Arundo, Giant Cane (*Arundo donax*)

Giant cane is a robust perennial grass 3 to 10 meters tall that grows in many-stemmed clumps, and spreads from horizontal rootstocks below the soil. The largest colonies occur in riparian areas and floodplains of medium- to large-sized streams, from wet sites to dry river banks far from permanent water. It was brought to this country very early (it was well-established by the early 19th century) and has spread widely. Minor infestations can be eradicated by hand, especially in loose soils or after rain, with new plants less than 2 meters in height. Plants can also be dug with hand tools, if roots are removed to prevent re-sprouting. For larger infestations heavier tools (rotary brush-cutter, chainsaw or tractor-mounted mower) are effective, though deep rhizomes will readily resprout. The most common herbicide against Arundo is glyphosate, applied as a foliar spray post-flowering and pre-dormancy, usually late July to early October when plants are translocating nutrients into root and rhizomes. Concentrated glyphosate solution can be applied to stems immediately after cutting by painting with a cloth-covered wand or a sponge, or spraying with a hand mister. New growth is sensitive to herbicides, so a mechanical / chemical combination involves cutting or mowing a patch, and returning to treat new growth when 1-2 meters tall by foliar spraying of glyphosate. In most circumstances burning of live or chemically-treated material should not be attempted, as it cannot kill the underground rhizomes and probably favors Giant reed regeneration over native riparian species.

Bermuda Grass (*Cynodon dactylon*)

Bermuda grass, often used as a forage for livestock was introduced from Africa in 1751 and is widely spread throughout the southwest United States. It is a low-growing, wiry perennial that has both above and below-ground shoots. Bermuda grass can be managed nonchemically with a persistent removal, or over large areas with cultivation and withholding water during the summer to desiccate the stolons and rhizomes. This is especially effective when used with some tilling to dry out the rhizomes and stolons. Mulches of black plastic or geotextile landscape fabric can also be effective over large areas if light is excluded. Alternatively, Bermudagrass growth can be reduced by increasing shade from trees and tall shrubs. Mulching with products such as wood chips is not effective. Established stands can be controlled with post-emergent herbicides applied to leaves and stems when they are growing vigorously.

Early spring is the best time to apply a selective herbicide, with a re-application before the regrowth reaches 6 inches in length, with additional applications as needed.

The preferred method for control of Bermudagrass on Service lands is with *directed or broadcast* application of glyphosate (avoiding spraying native perennials where feasible) to the growing plants. Glyphosate is a systemic, non-selective herbicide. Glyphosate as a very high Koc and does not tend to move in soil, so it is unlikely to inhibit seed sprouting of native annuals including annual grasses, thus facilitating site restoration.

Johnson Grass (*Sorghum halepense*)

Johnsongrass is a perennial grass originally introduced into the United States as a forage crop. Johnsongrass readily reproduces from rhizomes and seed; seedling plants can initiate rhizomes as few as 19 days following emergence. A single plant may produce more than 80,000 seeds in a single growing season, and 275 feet of rhizomes. Seeds shatter easily and fall to the ground beneath plants that produce them. Instead of germinating uniformly, seeds can remain dormant and produce plants over several years. Johnsongrass seed can remain viable in the soil for more than 10 years. Johnsongrass also can be controlled well with directed use of glyphosate. Retreatments are needed until the seedbed is exhausted.

Sahara Mustard (*Brassica tournefortii*)

Brassica tournefortii is an annual herb native to north Africa and the Middle East that first appeared in North America in the Coachella Valley in the 1920's. It has since spread west into coastal southern California, north and east through the Mojave and Sonoran deserts, and into the Colorado Plateau, primarily along roadsides. It thrives in sandy soils where it forms dense stands that suppress native wildflowers, although it can also dominate silty and rocky soils on hilltops during years of high rainfall. Dispersal is accomplished by individual seeds (spread actively by granivores or passively by wet seeds adhering to vehicles) and by entire uprooted plants tumbling with the wind.

Manual control via hand pulling is effective with small populations of new infestations of *Brassica tournefortii*, and should be used where feasible. Control of established and more extensive infestations requires use of herbicides. Two herbicides are preferred in the desert environment, metsulfuron-methyl (Escort) and imazapic (Plateau). Escort is most effective when applied at the "broccoli" stage of growth, with a backpack sprayer at 1 ounce of Escort per acre, with 1/2 % of a 90% active surfactant added. Once the *Brassica* has gone to full growth and is flowering, or if there are any native shrubs in the area and you're using an aerial or broadcast application, imazapic (Plateau) is preferred, since it will have only short-term impacts (some short-term defoliation) on the native shrubs and will not affect composites. Plateau is applied at 8 to 12 ounces per acre with a methylated seed oil adjuvant. Along roads and rights-of-way where removal of non-target vegetation is not a problem, the broad-spectrum herbicide glyphosate can also be used for control of *Brassica*.

Perennial pepperweed (*Lepidium latifolium*)

Perennial pepperweed is an invasive weed from Eurasia that readily invades disturbed areas and bare soils, usually via rhizomes. The seeds do not have a hard seed coat and so longevity in the soil may be short (several years). It is found in a wide range of habitats and replaces native grasses, sedges and rushes. *Lepidium latifolium* is a rhizomatous perennial, which makes it very difficult to control. Herbicides are generally required to achieve acceptable levels of control. Two herbicides have been used successfully on and adjacent to refuges in the southwest: 2,4-D amine and imazapic (Plateau). 2,4-D amine is applied just as the plants begin to bud. It is the preferred herbicide near water since the

amine form of 2,4-D will have minimal impact on aquatic organisms. Plateau is not labeled for use in water, and its use adjacent to water is consequently not desirable. It is an effective herbicide for sites that are not likely to flood or be subjected to extensive rainfall shortly after application, and where drift is unlikely to impact susceptible crops (particularly mustard family). Retreatments in subsequent years are required with either 2,4-D or Plateau for control of resprouts and new plants resprouting from the seedbed.

Fountain grass (*Pennisetum setaceum*)

Fountain grass is perennial bunch grass that is found in grasslands, deserts, canyons and roadsides. It is native to northern Africa and was introduced as an ornamental grass. It is a highly aggressive, fire-adapted species that readily out-competes native plants and reestablishes itself quickly after burning. Fountain grass alters the natural fire regimes in environments it invades by raising fuel loads, thus increasing the intensity and spread of fire. It reproduces primarily via wind-dispersed seeds that may remain viable in the soil for six years or longer. Small infestations may be managed by uprooting plants by hand and destroying the inflorescences. Extensive infestations are probably best controlled with the help of herbicides, especially those with some systemic activity. Control with glyphosate should be attempted first, followed if not successful by use of a grass-specific herbicide such as fluazifop-P-butyl (Fusilade)

Buffelgrass (*Pennisetum ciliare*)

Buffelgrass is a shrubby, drought-tolerant perennial grass that grows densely and crowds out native plants via shading and competition for water, and a dense root mass. It was introduced in the 1930's as a livestock forage. It normally becomes predominant on steep slopes, especially those with alkaline soils. In lowland riparian areas it can infest riverbanks. Much like fountain grass, buffelgrass changes plant communities by encouraging and carrying wildfires through communities that are not adapted to fire. The most effective treatment methods appear to be competitive exclusion (it is shade-intolerant), hand-grubbing and herbicides, such as a combination glyphosate, a broad-spectrum herbicide, and ammonium sulfate (fertilizer), applied after a rainfall, if possible.

Phragmites, Common Reed (*Phragmites australis*)

Common reed is an aggressive, robust, densely growing member perennial grass that can form dense monocultures that outcompete native wetland plants. The buildup of litter from previous years of growth prevents other species from germinating. It is tolerant of a wide variety of environmental conditions, including wetlands and wetland fringes in acidic and alkaline soils. Phragmites is susceptible to extended periods of flooding. Herbicides, especially glyphosate, are effective in the short term (4-5 years) and should be applied after the plants form flower clusters, when the plants are sending carbohydrates to the rhizomes. Combined cutting, burning, herbicide application and water management plans can help control the plant by removing old canes. For effective management, cut plants in late summer (it can become more robust if cut too early) in several successive years.

Smotherweed, Five-hook Bassia, Kochia (*Kochia scoparia*)

Kochia is an annual plant native to Asia. It has a deep taproot, reproduces from seeds, and competes with native plants for light, nutrients, and soil moisture. Kochia is highly adaptable, can withstand saline soils, is drought tolerant, and can spread rapidly. It is found on pasture, rangeland, roadsides, ditch banks, wastelands, and cultivated fields. Seeds germinate very early in spring because of their frost tolerance and the plant grows very rapidly through spring and summer. Early tillage in the spring gives good control of the kochia seedlings. Mowing or slashing the plants before flowering is effective

in reducing seed production. Managed grazing by goats may also be effective in monocultures of kochia. Due to extensive agricultural use of herbicides on kochia, and the plant's enormous seed production, kochia has become resistant to a number of herbicides, so non-herbicidal methods of control are generally preferred.

Schismus, Mediterranean Grass (*Schismus barbatus*)

Mediterranean grass is a tufted annual cool-season grass most often occurring in agricultural areas, desert, and disturbed sites, especially in sandy soils, sandy flats, arroyos and washes, and dunes. It spreads close to the ground, preventing native ephemerals from sprouting, and it can facilitate the spread of fire. It is difficult to control due to its tendency to carpet the ground and produce large amounts of small seeds early in the growing season. Although fire and livestock grazing may temporarily reduce its biomass, in the long run it promotes its dominance. Herbicides such as glyphosate can be effective, but application is difficult due to the small leaf area.

Red Brome (*Bromus rubens*)

Red brome is a tufted, cool-season annual bunchgrass most common in agricultural areas, deserts, disturbed areas, and rangelands and grasslands, especially on south-facing, shallow, dry soil or poor textured, clayey soil. Once established, it has the potential to compete with other grasses has the potential to increase fire frequency, resulting in the loss of native perennial species. Seeds are able to move in seed grain, feed, and forage, and are also scattered by water and animals. Annual removal of seed heads will significantly decrease the amount of red brome. Established native plants will often out-compete red brome seedlings. Plants will not reach maturity if the seedlings are uprooted (roots are generally shallow) and thus no seed source for the following year will be produced. While burning can increase the invasiveness of red brome, it may temporarily help in changing the balance of the plant community back to natives. As an annual grass, red brome presents a control challenge. Incipient populations should be controlled using directed applications of glyphosate.

Rocket Mustard, London Rocket (*Sisymbrium irio*)

Rocket mustard is an annual weed native of Great Britain. It is especially common in disturbed areas. Small populations of London rocket are easily pulled and should be removed by hand, and bagged and removed from site if they are beginning to flower. Larger infestations can be controlled with imazapic or, if monocultures, with glyphosate.

Saltcedar, Tamarisk (*Tamarix* spp.)

Saltcedar is a noxious weed introduced from Asia in the early part of the last century and has invaded many riparian and wetland areas in the Southwest. It thrives in disturbed areas, eventually crowding out native vegetation. It responds to cutting or burning by vigorously re-sprouting. It also aggressively colonizes new areas by wind and water transported seed. It has been shown to provide lower value for most native wildlife (Ellis 1993), and transpires large amounts of groundwater (Cleverly et al. 2002). More importantly for the purposes of this report, saltcedar is more fire prone than native species (Sogge et al. 1997). If left uncontrolled, saltcedar will recolonize the burned area and, within a few years, present another severe fire hazard. Approximately 84% of the area that burned during this fire was either saltcedar-dominated, or had a high saltcedar component (Table 1). Saltcedar has been targeted for management by several land management agencies along the Lower Colorado River and is a central management focus of the Refuge.

There are numerous effective methods for controlling salt cedar using the herbicides imazapyr as an

aerial, foliar, or cut stump application, and triclopyr as a foliar, basal and cut stump application. The preferred method on resprouts on burn sites, however, is using a 25% concentration of Garlon 4, mixed with 75% all natural vegetable oil adjuvant that includes a penetrant (such as limonene), as a basal application.

Cultural and Historic Resources

There have been no cultural or historic resources identified that were affected by the fire.

III. Summary Recommendations for Burned Area Rehabilitation

Burned Area Rehabilitation in the first year following the Cibola Fire will follow a four-step management sequence (See descriptions above):

- Site Preparation
- Site Assessment
- Site Treatment Planning
- Implementation
- Treatment Effectiveness Monitoring

IV. References

Taylor, J.P. and K.C. McDaniel. 1998. Restoration of saltcedar (Tamarisk sp.) infested floodplains on the Bosque del Apache National Wildlife Refuge. *Weed Technology* 12(2) 345-352.

U.S. Fish and Wildlife Service. 2006. Integrated pest management plan to control and manage nonnative invasive plant and animal species on Cibola National Wildlife Refuge.

APPENDIX II

ENVIRONMENTAL COMPLIANCE

Federal, State, and Private Lands Environmental Compliance Responsibilities

All projects proposed in the Cibola Burned-Area Rehabilitation Plan that are prescribed, funded, or implemented by Federal agencies on Federal, State, or private lands are subject to compliance with the National Environmental Policy Act (NEPA) in accordance with 40 CFR 1500-1508, and Department of the Interior and FWS regulations. This Appendix documents the Burned Area Emergency Response team considerations of NEPA compliance requirements for prescribed rehabilitation and monitoring actions described in this plan for all jurisdictions affected by the Cibola Emergency Response Plan.

Related Plans and Cumulative Impact Analysis

The Cibola Burned-Area Rehabilitation Plan was reviewed and it was determined that actions proposed within the boundary of the Fire are consistent with the management objectives of the Refuge, including management of and impact to the following resources:

- Biological Resources
- Air Quality
- Water Quality
- Wetland Preservation and Enhancement
- Compatibility and Service Policy on Recreational Uses
- Cultural Resources
- Socioeconomics

Cumulative Impact Analysis

Cumulative impacts are the environmental impacts resulting from the proposed action when added to other past, present, and reasonably foreseeable future actions, both Federal and non-Federal. Cumulative impacts can result from individually minor but collectively significant actions.

Treatment as proposed in this plan will not result in an intensity of impact that would cumulatively constitute a significant impact on the quality of the environment. The treatments are consistent with management plans and associated environmental compliance.

Applicable and Relevant Categorical Exclusions

The individual actions proposed in this plan for the Cibola Fire burned area are Categorically Excluded from further environmental analysis as provided for in the Department of Interior and FWS categorical exclusions. All applicable and relevant Department and Agency Categorical Exclusions are listed below. Categorical Exclusion decisions were made with consideration given to the results of required emergency consultations completed by the Burned area emergency response team and documented below.

Applicable Department of Interior Categorical Exclusions
516 DM 2 App; 2, 1.6
516 DM 6 App. 7.4 L (3)

Applicable FWS Categorical Exclusions
516 DM 6 App. 1.4 B (1)
516 DM 6 App. 1.4 B (3) iii
516 DM 6 App. 1.4 B (5)

Statement of Compliance for the Cibola Fire Burned Area Rehabilitation Plan.

This section documents consideration given to the requirements of specific environmental laws in the development of the Cibola Burned-Area Rehabilitation Plan. Specific consultations initiated or completed during development and implementation of this plan are also documented. The following executive orders and legislative acts have been reviewed as they apply to the Cibola Burned-Area Rehabilitation Plan:

- National Historic Preservation Act (NHPA)
- Executive Order 11988. Flood plain Management.
- Executive Order 11990. Protection of Wetlands
- Executive Order 12372. Intergovernmental Review
- Executive Order 12892. Federal Actions to Address Environmental Justice in Minority and Low-income Populations
- Endangered Species Act
- Secretarial Order 3127. Federal Contaminated
- Clean Water Act
- Clean Air Act

NEPA Checklist

If any of the following exception applies, the Burned Area Emergency Response Plan cannot be Categorically Excluded and an Environmental Assessment (EA) is required.

(Yes) (No)

- ☐ ☐ Adversely affect Public Health and Safety
- ☐ ☐ Adversely affect historic or cultural resources, wilderness, wild and scenic rivers aquifers, prime farmlands, wetlands, floodplains, ecologically important areas, or natural landmarks.
- ☐ ☐ Have highly controversial environmental effects.
- ☐ ☐ Have highly uncertain environmental effects or involve unique or unknown environmental risks.
- ☐ ☐ Establish a precedent resulting in significant environmental effects.
- ☐ ☐ Relates to other actions with individually insignificant but cumulatively significant environmental effects.
- ☐ ☐ Adversely effects properties listed or eligible for listing in the National Register of Historic Places
- ☐ ☐ Adversely affect a species listed or proposed to be listed as Threatened or Endangered.
- ☐ ☐ Threaten to violate any laws or requirements imposed for the "protection of the environment" such as Executive Order 1-1-988 (Floodplain Management) or Executive Order 1-1-990 (Protection of Wetlands).

National Historic Preservation Act

Ground Disturbance:

- ☐ None
- ☐ Ground disturbance did occur and an archeologist survey, required under section 110 of the NHPA will be prepared. A report will be prepared as specified by the Burned Area Emergency Response Plan.

NHPA Clearance Form:

- ☐ Is required because the project may have affected a site that is eligible or on the national register. The clearance form is attached. SHPO has been consulted under Section 106.
- ☐ Is not required because the Burned Area Emergency Response Plan has no potential to affect cultural resources (initial of cultural resource specialist).

Other Requirements

(Yes) (No)

- ☐ ☐ Does the Burned Area Rehabilitation Plan have potential to affect any Native American uses? If so, consultation with affiliated tribes is needed.
- ☐ ☐ Are any toxic chemicals, including pesticides or treated wood, proposed for use? If so, local agency integrated pest management specialists must be consulted.

I have reviewed the proposals in the Cibola Emergency Response Plan in accordance with the criteria above and have determined that the proposed actions would not involve any significant environmental effect. Therefore it is categorically excluded from further NEPA review and documentation. Burned area emergency response team technical specialists have completed necessary coordination and consultation to insure compliance with the National Historic Preservation Act, Endangered Species Act, Clean Water Act and other Federal, State and local environment review requirements.

Burned Area Emergency Response Team Environmental Protection Specialist

Date

Project Leader

Date

APPENDIX III

SOILS INVESTIGATIONS FOR THE REHABILITATION OF BURNED AREAS ON THE CIBOLA WILDLIFE REFUGE, CIBOLA, ARIZONA

1.0 Introduction

The following technical methods and cost estimates apply to approximately 4662 acres of a burned area of the Colorado River Bosque near Cibola, Arizona. The vegetation in the area was severely burned to the extent that rehabilitation measures will be required to restore the Bosque to a desirable condition. Soil conditions that exist in the burned area will greatly affect the success of the rehabilitation efforts, and an accurate inventory of soil conditions will assist in the selection of the most appropriate alternatives for the revegetation. It is therefore necessary that a soil inventory be conducted on all areas for which rehabilitation practices will be implemented.

The scope of the soil survey and data collection activities includes:

- a. 1st Order (or Order 1) soil survey.
 - (1) Field description and classification of the soils
 - (2) Laboratory analysis of soil samples
 - (3) Presentation of data in terms of suitability for revegetation
 - (4) Map presentation
- b. EM Salinity Survey (Soil Salinity Assessment)
- c. Report describing the results and significance of the findings

These studies are technical in nature and need to be conducted by professionals who can document a high degree of competence in the field of soil science. Significant decisions will be based upon this study, and it is imperative that the data be technically sound and appropriate to rehabilitation objectives.

A national certification program for soil scientists has been employed for a number of years by the Soil Science Society of America and the American Society of Agronomy and is commonly used across the nation to verify the qualifications of soil scientists. It is recommended that the Service requires any professional who conducts these studies to be a Certified Professional Soil Classifier under the ARCPACS program.

Each of these activities is discussed in the following sections.

2.0 1st Order (Order 1) Soil Survey

The National Cooperative Soil Survey is a soil inventory program administered by the Natural Resources Conservation Service (NRCS). Detailed procedural guidelines for conducting soil surveys of varying levels of intensity are prepared and published by the NRCS. Intensive management activities, such as vegetation rehabilitation of Bosque areas, are best served by a 1st Order (Order 1) soil survey. This survey includes the following components:

- (1) Accurate description and classification of the soils within the area: This includes detailed soil profile examination and documentation, and classification of the soils according to the NRCS Soil Taxonomy system. Properties should be described to a depth of at least 5 feet and should include, as a minimum: (1) soil texture, (2) soil structure, (3) pH, (4) soil salinity and sodicity, (5) estimated available water capacity, (6) estimated permeability; and (7) depth

to seasonal water table. Other site-specific features that might affect revegetation/rehabilitation efforts should be noted as well. These activities should be done in full accordance with the National Cooperative Soil Survey guidelines.

- (2) Soil sample collection: Sufficient soil samples will be collected for the accurate classification and description of the soils. At least one soil profile of each soil taxonomic unit will be sampled and analyzed. Tests will include (1) texture by hydrometer; (2) pH of the soil saturated paste; (3) electrical conductivity of the soil saturation paste extract; (4) sodium adsorption ratio of the soil saturation extract; (5) calcium carbonate equivalent (surface soil only); (6) gypsum requirement.
- (3) Accurate mapping of soil types in the area: The base map should be photographic and at a scale of at least 1:12,000. USGS orthophotographs are suitable for base mapping. The maps should be digitized into ARCVIEW or ARCINFO for use in subsequent analyses.
- (4) Interpretation of soil types for revegetation suitability: Suitability criteria will be developed, specific to the area, for revegetation. These criteria will be developed jointly with the project soil scientist and either the Fish and Wildlife Service biologist or the contract biologist. Each soil map unit will be rated according to these criteria.

3.0 EM Salinity Survey (Soil Salinity Assessment)

The U.S. Salinity Laboratory of the U.S.D.A. Agricultural Research Service has developed a non-intrusive methodology for accurately and efficiently mapping field soil salinity. The technology uses an instrument called EM-38. The EM-38 measures bulk soil conductivity, which can be accurately correlated to soil salinity. The EM-38, when employed with an accurate GPS system, can quickly establish hundreds of data-points in an area at which soil salinity can be characterized in depth-increments of one foot, to a maximum of about four feet. These data, when properly interpreted, can indicate the need and quantity of soil leaching and salinity reclamation on a very detailed scale. When utilized with the properties described in the soil survey, a complete set of soil data is established to assist the land manager in the selection of appropriate remediation practices.

4.0 Report Preparation

A report will be prepared that describes the methodology and presents the results of both the Order 1 soil survey and the EM-38 survey. Maps will be digitized into ARCVIEW or ARCINFO for data presentation and analysis.

5.0 Cost Estimate

The cost estimate for this project is presented on a per-acre basis for approximately 4662 acres. If the size of the area should be significantly increased, the unit cost per acre would decline. If the size of the area should be significantly decreased, the cost per acre would increase. The cost estimate for the 4662-acre area follows.

Soil Survey: Approximately \$15.00 per acre. This cost includes all equipment, per diem, personnel, supplies, and soil analyses needed for the soil survey.

EM-38 Survey: Approximately \$15.00 per acre. This includes all equipment, per diem, personnel, supplies, and soil analyses needed for the survey.

Comprehensive Report: Approximately \$8,000. The report will include (1) Order 1 soil survey report, (2) EM-38 survey report, (3) Soil survey maps, (4) EM-38 survey maps, (5) Various maps of selected soil properties (such as surface texture, permeability, depth to water table, etc.); (6) revegetation suitability maps.

Total estimated cost is as follows:

Soil Survey: \$15 per acre for 4662 acres:	\$69,930
EM Survey: \$15 per acre for 4662 acres:	\$69,930
Report:	<u>\$ 8,000</u>
TOTAL COST	\$147,860

APPENDIX IV

THREATENED AND ENDANGERED SPECIES POSSIBLY PRESENT NEAR THE BURN AREA

Species	Federal Status	Present During...	Potential Numbers in Fire Area	Affected by Fire?
Southwestern Willow Flycatcher	Endangered	Migration, Breeding		
Yuma Clapper Rail	Endangered	Breeding		
Bald Eagle	Threatened	Winter		
Yellow-billed cuckoo	Candidate	Migration, Breeding		
Razorback Sucker	Endangered, with Critical Habitat present	All Year, in mainstem LCR and connected backwaters; High Levee Pond		
California Brown Pelican	Endangered	Transients Only		
Bonytail Chub*	Endangered	All Year		
<i>*Present in artificially-created rearing ponds</i> <i>NOTE: There are no federally-listed plants present</i>				